

## MDMA (Ecstasy)

MDMA (3,4 methylenedioxymethamphetamine) is a synthetic, psychoactive drug chemically similar to the stimulant methamphetamine and the hallucinogen mescaline. Street names for MDMA include Ecstasy, Adam, XTC, hug, beans, and love drug. MDMA is an illegal drug that acts as both a stimulant and psychedelic, producing an energizing effect, as well as distortions in time and perception and enhanced enjoyment from tactile experiences.

MDMA exerts its primary effects in the brain on neurons that use the chemical serotonin to communicate with other neurons. The serotonin system plays an important role in regulating mood, aggression, sexual activity, sleep, and sensitivity to pain.

Research in animals indicates that MDMA is neurotoxic; whether or not this is also true in humans is currently an area of intense investigation. MDMA can also be dangerous to health and, on rare occasions, lethal.

### **Health Hazards** —

For some people, MDMA can be addictive. A survey of young adult and adolescent MDMA users found that 43 percent of those who reported ecstasy use

met the accepted diagnostic criteria for dependence, as evidenced by continued use despite knowledge of physical or psychological harm, withdrawal effects, and tolerance (or diminished response), and 34 percent met the criteria for drug abuse. Almost 60 percent of people who use MDMA report withdrawal symptoms, including fatigue, loss of appetite, depressed feelings, and trouble concentrating.

### **Cognitive Effects**

Chronic users of MDMA perform more poorly than nonusers on certain types of cognitive or memory tasks. Some of these effects may be due to the use of other drugs in combination with MDMA, among other factors.

### **Physical Effects**

In high doses, MDMA can interfere with the body's ability to regulate temperature. On rare but unpredictable occasions, this can lead to a sharp increase in body temperature (hyperthermia), resulting in liver, kidney, and cardiovascular system failure, and death.

Because MDMA can interfere with its own metabolism (breakdown within the body), potentially harmful levels can be reached by repeated drug use within short intervals.

Users of MDMA face many of the same risks as users of other stimulants such as cocaine and amphetamines. These include increases in heart rate and blood pressure, a special risk for people with circulatory problems or heart disease, and other symptoms such as muscle tension, involuntary teeth clenching, nausea, blurred vision, faintness, and chills or sweating.

### ***Psychological Effects***

These can include confusion, depression, sleep problems, drug craving, and severe anxiety. These problems can occur during and sometimes days or weeks after taking MDMA.

### ***Neurotoxicity***

Research in animals links MDMA exposure to long-term damage to neurons that are involved in mood, thinking, and judgment. A study in nonhuman primates showed that exposure to MDMA for only 4 days caused damage to serotonin nerve terminals that was evident 6 to 7 years later. While similar neurotoxicity has not been definitively shown in humans, the wealth of animal research indicating MDMA's damaging properties suggests that MDMA is not a safe drug for human consumption.

### ***Hidden Risk: Drug Purity***

Other drugs chemically similar to MDMA, such as MDA (methylened-

dioxyamphetamine, the parent drug of MDMA) and PMA (paramethoxyamphetamine, associated with fatalities in the U.S. and Australia) are sometimes sold as ecstasy. These drugs can be neurotoxic or create additional health risks to the user. Also, ecstasy tablets may contain other substances in addition to MDMA, such as ephedrine (a stimulant); dextromethorphan (DXM, a cough suppressant that has PCP-like effects at high doses); ketamine (an anesthetic used mostly by veterinarians that also has PCP-like effects); caffeine; cocaine; and methamphetamine. While the combination of MDMA with one or more of these drugs may be inherently dangerous, users might also combine them with substances such as marijuana and alcohol, putting themselves at further physical risk.

### ***Extent of Use*** ———

#### ***National Survey on Drug Use and Health (NSDUH)\****

MDMA is called ecstasy in the NSDUH. In 2005, an estimated 502,000 people in the U.S. age 12 or older used MDMA in the past month. While lifetime use increased among those 12 or older from 2002 to 2005, there were significant declines in lifetime use from 2004 to 2005 among those 12 to 17 and 14 or 15. Other 2005 NSDUH results show significant increases in past month use

among females and declines in past year use among those 12 or older. Approximately 615,000 Americans used ecstasy for the first time in 2005.

The majority of these new users were 18 or older (65.9 percent). Among past year initiates aged 12 to 49, the average age at initiation of Ecstasy in 2005 was 20.7 years.

### **Community Epidemiology Work Group (CEWG)\*\***

In many of the areas monitored by CEWG members, MDMA, once used primarily at dance clubs, raves, and college scenes, is being used in a number of other social settings. In addition, some members reported increased use of MDMA among African-American and Hispanic populations.

### **Monitoring the Future (MTF) Survey\*\*\***

Past year\*\*\*\* use of MDMA was reported by 1.4 percent of 8th-graders, 2.8 percent of 10th-graders, and 4.1 percent of 12th-graders in 2006. Although these figures represent significant reductions in use since the peak year in 2001, trends in use have

remained relatively stable over the past 3 years among these grade cohorts.

Results from the current survey represent the second year in a row showing a weakening of attitudes among the youngest of students regarding MDMA. The proportion of 8th-graders reporting perceived risk of harm from using MDMA once or twice decreased significantly, from 40 percent in 2005 to 32.8 percent in 2006, and perceived harm from using it occasionally dropped from 60.8 percent to 52.0 percent.

Disapproval of use also decreased significantly among 8th-graders for both trying MDMA once or twice and for taking it occasionally.

### **Lifetime Prevalence of MDMA Use by Students Monitoring the Future Survey, 2004-2006**

	2004	2005	2006
8th-Graders	2.8%	2.8%	2.5%
10th-Graders	4.3	4.0	4.5
12th-Graders	7.5	5.4	6.5

For more information, please visit [www.ClubDrugs.org](http://www.ClubDrugs.org) and [www.Teens.drugabuse.gov](http://www.Teens.drugabuse.gov).

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\* NSDUH (formerly known as the National Household Survey on Drug Abuse) is an annual survey of Americans age 12 and older conducted by the Substance Abuse and Mental Health Services Administration. Copies of the latest survey are available at [www.samhsa.gov](http://www.samhsa.gov) and from the National Clearinghouse for Alcohol and Drug Information at 800-729-6686.

\*\* CEWG is a NIDA-sponsored network of researchers from 21 major U.S. metropolitan areas and selected foreign countries who meet semiannually to discuss the current epidemiology of drug abuse. CEWG's most recent reports are available at [www.drugabuse.gov/about/organization/cewg/pubs.html](http://www.drugabuse.gov/about/organization/cewg/pubs.html).

\*\*\* These data are from the 2006 Monitoring the Future Survey, funded by the National Institute on Drug Abuse, National Institutes of Health, DHHS, and conducted annually by the University of Michigan's Institute for Social Research. The survey has tracked 12th-graders' illicit drug use and related attitudes since 1975; in 1991, 8th- and 10th-graders were added to the study. The latest data are online at [www.drugabuse.gov](http://www.drugabuse.gov).

\*\*\*\* "Lifetime" refers to use at least once during a respondent's lifetime. "Past year" refers to use at least once during the year preceding an individual's response to the survey. "Past month" refers to use at least once during the 30 days preceding an individual's response to the survey.



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